PAPERS

IN

MANUFACTURES.

SPECIMEN OF PAPER

FROM THE

PAUT-PLANT.

MANUFACTURES.

The Sum of TWENTY GUINEAS, being the Premium offered for making PAPER from raw VEGETABLE SUBSTANCES superior to any hitherto manufactured from such Substances, was this Session adjudged to Mr. THOMAS WILLMOTT, of Shoreham in Kent; from whom the following Accounts and Certificates were received.

SIR,

AT the particular request of Mr. Sewell, bookseller, in Cornhill, I made some Paper from Gunny-bags, he having very much wished something might be done to reduce the high price of rags.

I was afterwards informed that a Premium of Twenty Guineas was offered by the Society of Arts, &c. for ten reams

reams of useful Paper made from raw Vegetable Substances. I had made only six reams from the above article; and on mentioning it to Mr. Sewell, he told me he was apprehensive the Society would not allow the Premium for what I had made, it not being the quantity specified, nor made from the raw material; he therefore undertook to get me a quantity of the raw material from which Gunny-bags are made, that I might make the ten reams as specified. I have now made that quantity, and have sent one ream to the Society, and the other nine I have left with Mr. Sewell.

If the Society should think I merit the Premium, or any part of it, for the pains and trouble I have taken, I shall think myself much honoured by such mark of their favour.

I remain, SIR,

Your humble servant,

T. WILLMOTT.

Shoreham, Kent,
November 6, 1800.

Certificates were sent from William Strip and John Penfold, confirming the above; and that they had prepared the article, and saw it made into paper, and sent back to London on the 31st of October.

THIS is to certify, that I, JOHN SEWELL, of N° 32, Cornhill, having had a hint from a literary gentleman, long resident in India, that a specimen of paper which I had approved, was made in the East Indies from a vegetable called the Paut Plant, I applied to some of the principal persons in the Company's warehouse for that article, and was informed that a large quantity had been imported into England about seven years ago; that the whole was sold at from 18*s*. to 20*s*. per cwt. to various persons concerned in the sail, hammock, sack, and packthread business; that some went to Manchester and Scotland,

Scotland, but that none then remained in the Company's warehouse except samples.

From such samples, and what remained with the brokers, I collected enough to make the few reams of Paper manufactured by Mr. Thomas Willmott.

The first attempt failed, by the Paper being spoiled in bleaching; the Paper now sent, is the result of a second trial.

From further experiments made in my presence, by an ingenious chemist well skilled in the manufactory, it is found that gunny-bags, ropes, and other waste materials made from the same substance, will make a better paper.

It is also found by experience, that old rags, which have been used on the table, bed, or for apparel, make better paper than new flax or hemp.

Gunny-bags may be had from most grocers, gunpowder-makers, and dealers in

in India goods; as the Company send nearly all their importations in those bags. They may be bought in almost any quantity, at so cheap a rate as from a farthing to a penny per pound; and if introduced for manufacturing wrapping and other inferior Papers, they cannot fail to reduce the present high price of rags.

JOHN SEWELL.

Cornhill,
November 6, 1800.

Mr. CHARLES TAYLOR.

SIR,

SINCE I saw you, it has occurred to me, that the circumstance of ships being engaged to bring home rice from Bengal, may afford a better opportunity, than I first imagined, for bringing over a considerable quantity of *paut*. Experience has shewn that some ships cannot take such heavy articles as rice and sugar,

sugar, to the extent of their chartered tonnage. As *paut* may be shipped from Bengal at about 4*s*. per cwt. if it is put on board without being packed into bales, it seems an advantageous article to occupy that space in the upper part of rice ships, which must otherwise remain entirely vacant. As none of the *paut* hitherto brought over, has sold for less than 20*s*. per cwt. there appears to be ample room for profit to the importer, and very little capital risked.

It is procured at the lowest prices, and in the greatest abundance, at Maulda and Buddaul, where it costs barely 3*s*. per cwt.; in Calcutta the prices are higher. This article must be carefully distinguished from the *sun* which is deemed hemp, and is liable to a heavy duty. *Paut* is only liable to a small duty: it is known in India, and has been sent to Europe, by the name of *jute*, and may be characterised as the article

article with which gunnies are always made in Bengal.

I remain, SIR,

Your very humble servant,

H. W. GOODHALL.

To Mr. SEWELL.

*** The Society have been informed by Mr. Sewell, that two varieties of the Paut plant have been cultivated at Calcutta, viz.

Bhungee Paat, the Corchorus Olitorius of Linnæus, and the Ghee Naltha Paat, or Corchorus Capsularis.

The CHICOREE PLANT having for some years past been cultivated upon a very extensive scale in Germany, for the use of its Root as an excellent Substitute for Coffee, and for the advantage of its Herbage in feeding Cattle; the following Account of the Culture of the Plant, and Method of manufacturing Coffee from its Root, was sent from Germany, by Mr. JOHN TAYLOR, to the Secretary; with some of the Seed, and Samples of the Root in different Stages of its Preparation, which are placed in the Society's Repository for public inspection.

Mode of cultivating the English Chicoree Plant, Cichorium Intybus of Linnæus, Cichorien Wurzel, or Hindlæufte, of the Germans, as recommended by the Chicoree Coffee-Manufacturers at Dresden.

FOR cultivating the Chicoree Plant a sandy or loamy soil answers best: clay or heavy soil is not proper, because the

the roots cannot penetrate a sufficient depth, and because in such ground they are more difficult to be pulled up, the roots being usually half-a-yard in length. The ground must be either delved a spade or more in depth, or ploughed very deep by two ploughs following each other in the same furrow; this work is best done in autumn. The land must afterwards be lightly ploughed at the time of sowing; but it may be ploughed in like manner in spring, if omitted in autumn, then harrowed and immediately sown. Chicoree does not properly require stable manure, because the roots do not taste so well where cattle dung is used as in land unmanured. Fallow land, or land on which one crop has been grown, is very proper. If the ground be poor, marl, gypsum, lime, or the mud from ponds, are recommended as manures, or composts may be formed from two thirds of loam, and one third of dung for sandy soil; or of

two thirds sand and one third dung for loamy soil; by putting the mixture in a heap for some months, watering it repeatedly, and turning it with the spade some weeks before used. By adopting this method the Chicoree will be excellent, and the ground greatly improved for future cultivation.

As the roots run deep, the dung, when used, should be laid low. Changing the land each year is better for the Chicoree, and also for the ground, as by the weeding and working it is in good order for other crops. If the Chicoree be drilled and potatoes grown betwixt the rows, Chicoree may be planted two years together. As potatoes require to be well manured, a crop of corn may then be taken from the land, and Chicoree again planted for one year.

The seed of the preceding year should be chosen for sowing: it should be cleaned from the seeds of weeds, and be mixed with ashes and earth, to enable

it

it to be sown in such a manner that the roots may stand from four to six inches asunder.

Some persons steep the seed for twenty-four hours, in a solution made from three quarts of dung-liquor, six quarts of water, four ounces of common salt, and three ounces of saltpetre, to three pounds of seed; and if that quantity of water be not sufficient to moisten it, add more. After the seed has been steeped therein for eighteen or twenty-four hours, it may be mixed with ashes and earth as above mentioned, and sown on ground laid out in large flats previously harrowed: after sowing, it must be harrowed with one harrow, in the manner that clover and rape seed is covered.

On a Dresden acre of 300 square perches, of something more than fifteen English feet each, containing in the whole 67,500 square feet, three pounds

and a half to four pounds of seed are sown, according to the goodness of the seed.

The seed may be sown from the middle of April to the middle of June, so that towards autumn the roots may be drawn in succession as the land was sown sooner or later.

After the seed is sown, nothing more is required than to keep it clear from weeds, and either to draw out the thickest plants in August for use, to allow more room for the smaller ones, or to pluck out the smaller plants, which is the better way, as it will occasion the larger ones to increase until September and October, when they may be dug up to advantage.

The roots, when taken up, must be separated from the stalks, leaves, and fibres, which are commonly used for feeding cattle; the Chicoree Coffee manufacturers pay from 3*s*. to 4*s*. per cwt. for such green roots.

Those

Those who wish to raise seed for themselves on a small scale, must preserve some of the strongest roots in a hole in the earth during the winter, and plant them out in the spring: but those who grow the plants in quantities may reserve a plot of the best plants for that purpose; remembering to pluck out any bad plants from amongst them, as the best seed is only produced from good plants.

The seed must be gathered when the greatest part is ripe, by cutting off the stalk and placing it upright for some days in the sun, binding the top round with a little straw to guard the seed from the birds, and to allow it to ripen more perfectly. It is then beat or thrashed out, according as the quantity may require.

Additional Observations on the Culture and Preparation of Chicoree.

THE plants flourish best when they have been thinly sown and remain in such state; but where any vacancies occur, those may be filled up with transplanted roots, placed from four to six inches asunder. When the roots are taken up in the autumn, they are first washed, and then cut by a machine into thin slices; afterwards dried partly in the air, and the drying completed on a malt-kiln. They are then laid aside till roasted: when roasted, they will keep for a year or two in a dry place.

Such roots are best whose thicknesses are from one to two inches; if thicker, they are too coarse; and if thinner, have but little taste. In general the leaves are cut off, and used as food for cattle, some weeks previous to the roots being plucked

plucked up. Some persons strip the leaves several times during the summer, but then there is less produce of the roots.

The roots, when drawn and washed, should be sliced by the hand, or by a machine: they should then be thinly laid upon hurdles in an airy room, and often turned, to prevent them from rotting, and to assist the air in drying them before they are carried to the malt-kiln. If the quantity is small, they may be dried by the common stoves of the room. No more roots should be dug up at once than can be washed and sliced on the same day, if possible.

Manufacture of the Coffee from dried Chicoree Roots.

The dried Roots are roasted in iron coffee-drums, containing from half a bushel to one bushel each; these drums are placed within brick furnaces, in which

which a space of half a foot is left betwixt the brick-work and the drum, on every side, so that the heat may be equally divided: within the drum are thin bars of iron, running lengthways, to shake or divide the roots whilst roasting; during which operation the drum is constantly kept turning by a handle placed on its axis. The criterion of the roots being properly roasted, is, that they are not too dark as if burnt, nor too light-coloured for want of sufficient roasting: the large and small slices should be roasted separately.

After this operation the roots are ground in the manner of flour, in similar mills, and the fine reserved for use; but the coarser part is again returned to the mill, to be finer ground: it is then packed in casks, or put up in paper bags, as may be thought necessary, and preserved dry.

This powder is the Coffee, and may be prepared alone, as common coffee-berries,

berries, when ground for use; or it may be mixed with one quarter or one half of its weight of genuine West India or Turkey coffee, at discretion. The price at which it is sold, is usually from five-pence to eight-pence per lb. Raw coffee-berries, mixed with the root whilst roasting, improve its odour and quality.

Large manufactories of the Chicoree Coffee are established, with considerable profit to the proprietors, at Berlin, Magdeburg, Brunswick, Dresden, and other parts of the Continent.

The article is become in general demand and use throughout Germany, as a pleasant and wholesome nourishment, in place of West-India coffee, which formed a considerable part of the diet of the inhabitants.

Leipsig,
June 4, 1800.